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Previous Year Paper

Chemistry - 2018

Fill In the Blanks

1. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

   (square pyramidal, electrical, 74; 26, sp^3d^2, sp3d, chemical, 68, 32, tetrahedral, yellow, white, iodoform, Lucas)

   A Galvanic cell converts _____energy into_____energy.

   Answer

2. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

   (square pyramidal, electrical, 74; 26, sp^3d^2, sp3d, chemical, 68, 32, tetrahedral, yellow, white, iodoform, Lucas)

   The percentage of unoccupied spaces in bcc and fcc arrangements are _____ and _____respectively.

   Answer

3. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

   (square pyramidal, electrical, 74; 26, sp^3d^2, sp3d, chemical, 68, 32, tetrahedral, yellow, white, iodoform, Lucas)

   Propan-2-ol on reaction with iodine and sodium hydroxide gives _____ precipitate and the reaction is called _____ test.

   Answer

4. Fill in the blanks by choosing the appropriate word/words from those given in the brackets:

   (square pyramidal, electrical, 74; 26, sp^3d^2, sp3d, chemical, 68, 32, tetrahedral, yellow, white, iodoform, Lucas)

   The geometry of $XeOF_4$ molecule is _____ and the hybridisation of Xenon atom in the molecule is _____.

   Answer

Match The Following

5. Match the following:

A. Rate constant	(i) Dialysis

B. Biodegradable	(ii) Glycine
C. Zwitterion	(iii) Aniline
D. Purification of colloids	(iv) PHBV

Answer

Multiple Choice Questions

6. Complete the following statements by selecting the correct alternative from the choices given:
During the course of an S_N1 reaction, the intermediate species formed is:

   A. a carbocation
   B. a free radical
   C. a carbanion
   D. an intermediate complex

Answer

7. Complete the following statements by selecting the correct alternative from the choices given:
Purification of aluminium by electrolytic refining is called:

   A. Serpeck's process
   B. Hoope's process
   C. Hall's process
   D. Baeyer's process

Answer

8. Complete the following statements by selecting the correct alternative from the choices given:
An aqueous solution of urea freezes at – 0.186°C, K_f for water = 1.86 K kg $mo1^{-1}$, K_b for water = 0.512 K kg $mo1^{-1}$. The boiling point of the urea solution will be:

   A. 373.065 K
   B. 373.0512K
   C. 373.186 K
   D. 373.512 K

Answer

9. Complete the following statements by selecting the correct alternative from the choices given:
In the dehydration of alcohols to alkenes by heating with concentrated sulphuric acid, the initiation step is:

   A. formation of carbocation
   B. formation of an ester

C. protonation of the alcohol molecule

D. elimination of water

Answer

Short Answer Type

10. Answer the following questions:

    Why does the density of transition elements increase from Titanium to Copper? (at. no. Ti = 22, Cu = 29)

    Answer

11. Answer the following question:

    Why does the density of transition elements increase from Titanium to Copper? (at. no. Ti = 22, Cu = 29)

    Answer

12. Identify the compounds A, B and C.

    CH3CN →H2O/H+ A →NH3 B →Heat C→Br2/KOH D

    Answer

13. Calculate the osmotic pressure of a solution prepared by dissolving 0.025 g of K_2SO_4 in 2.0 litres of water at 25°C assuming that K_2SO_4 is completely dissociated. (mol. wt. of K_2SO_4 = 174 g mol^{-1})

    Answer

14. What type of isomerism is shown by the following coordination compounds:

    $[PtCl_2(NH_3)_4]Br_2$ and $[PtBr_2(NNH_3)_4]Cl_2$

    Write their IUPAC names.

    Answer

15. (i) Write the rate law expression for the reaction A+ B +C → D +E, if the order of reaction is first, second and zero with respect to A, B, and C, respectively.

    (ii) How many times the rate of reaction will increase if the concentration of A, B and C are doubled in the equation given in (i) above?

    Answer

16. The rate of reaction becomes four times when the temperature changes from 293 K to 313 K. Calculate the energy of activation (E_a) of the reaction assuming that it does not change with temperature. (R = 8.314 J K^{-1} mol^{-1})

    Answer

17. How do antisemitic differ from disinfectants?

    Answer

18. State the role of the following chemicals in the food industry:

(i) Sodium benzoate

(ii) Aspartame

Answer

19. An aromatic organic compound [A] on heating with NH3 and Cu_2O at high pressure gives [B]. The compound [B] on treatment with an ice-cold solution of $NaNO_2$ and HCl gives [C], which on heating with Cu/HCl gives compound [A] again. Identify the compounds [A], [B] and [C]. Write the name of the reaction for the conversion of [B] to [C].

    Answer

20. Write the names of the monomers for the following polymers:

    Bakelite

    Answer

21. Write the names of the monomers for the following polymer:

    Nylon-2-nylon-6

    Answer

22. Name the purine bases and pyrimidine bases present in RNA and DNA.

    Answer

23. How will you obtain the following? (Give balanced equation.)

    Picric acid from phenol

    Answer

24. How will you obtain the following? (Give balanced equation.)

    Ethyl chloride from diethyl ether.

    Answer

25. 40% of a first-order reaction is completed in 50 minutes. How much time will it take for the completion of 80% of this reaction?

    Answer

26. The freezing point of a solution containing 5.85 g of NaCl in 100 g of water is –3.348°C. Calculate the van't Hoff factor for this solution. What will be the experimental molecular weight of NaCl? (K_f for water = 1.86 K kg mol–1, at wt, Na = 23, Cl = 35.5)

    Answer

27. An aqueous solution containing 12.48 g of barium chloride ($BaCl_2$) in 1000g of water, boils at 100.0832°C. Calculate the degree of dissociation of barium chloride.

    (Kb for water = 0.52 K kg mol^{-1}, at. wt. Ba = 137, Cl = 35.5)

    Answer

28. Examine the defective crystal given below and answer the question that follows :

A^+	B^-	A^+	B^-	A^+
B^-		B^-	A^+	B^-
A^+	B^-	A^+		A^+
B^-	A^+	B^-	A^+	B^-

State if the above defect is stoichiometric or non-stoichiometric. How does this defect affect the density of the crystal? Also, write the term used for this type of defect.

Answer

29. Give a reason for the following:

For ferric hydroxide sol, the coagulating power of phosphate ion is more than chloride ion.

Answer

30. Give a reason for the following:

Medicines are more effective in their colloidal form.

Answer

31. Give a reason for the following:

Gelatin is added to ice creams.

Answer

32. For the complex ion $[Fe(CN)_6]^{3-}$, state:

(i) The type of hybridisation

(ii) The magnetic behaviour

(iii) The oxidation number of the central metal atom

Answer

33. Write the IUPAC name of $[Co(en)_2Cl_2]^+$ ion and draw the structure of its geometrical isomers.

Answer

34. Explain why :

Mn^{2+} is more stable than Fe^{2+} towards oxidation to +3 state. (At. no. of Mn = 25, Fe = 26)

Answer

35. Explain why:

Transition elements usually form coloured ions.

Answer

36. Explain why:

Zr and Hf exhibit similar properties.

Answer

37. Complete and balance the following chemical equations: (i) $KMnO_4 + KI + H_2SO_4 \rightarrow$ ___ + ___ + ___ + ___ (ii) $K_2Cr_2O_7 + H_2SO_4 + H_2S \rightarrow$ ___ + ___ +

(iii) $KMnO4 + H2SO4 + FeSO4 \rightarrow$ ___ + ___ + ___ + ___

Answer

38. Arrange the following in the increasing order of their basic strength:

$C_2H_5NH_2$, $C_6H_5NH_2$, $(C_2H_5)_2NH$

Answer

39. Give a balanced chemical equation of convert methyl cyanide to ethyl alcohol.

Answer

40. What happens when benzene diazonium chloride reacts with phenol in weak alkaline medium? (Give balanced equation).

Answer

41. Name the sulphide ore of Copper. Describe how pure copper is extracted from this ore.

Answer

42. Calculate the emf and $\triangle G^{o}$ for the cell reaction at 25°C:

$Zn(s)|Zn^{2+}(aq)\ ||Cd^{2+}\ (aq)|\ Cd(s)$

$Zn^{2+}(aq)$ = (0.1 M)

Cd^{2+} (aq) = (0.01 m)

Given $E^{o}\ Zn^{2+}/Zn$ = -0.763 and $E^{o}\ Cd^{2+}/Cd$ = -0.403 V

Answer

43. Define the following terms :

(1) Equivalent conductivity

(2) Corrosion of metals

Answer

44. The specific conductivity of a solution containing 5 g of anhydrous $BaCl_2$ (mol. wt = 208) in 1000 cm^3 of a solution is found to be 0.0058 $ohm^{-1}cm^{-1}$. Calculate the molar and equivalent conductivity of the solution.

Answer

45. What is an electrochemical series? How is it useful in predicting whether a metal can liberate hydrogen from acid or not?

Answer

46. Explain why :

Nitrogen does not form pentahalides

Answer

47. Explain why :

Helium is used for filling weather balloons.

Answer

48. Explain why :

ICl is more reactive than I_2

Answer

49. Draw the structures of the following :

(1) $HClO_4$

(2) H_3PO_3

Answer

50. Explain why :

Mercury loses its meniscus in contact with ozone.

Answer

51. Halogens are coloured and the colour deepens on moving down in the group from fluorine to iodine.

Answer

52. Explain why:

Hydride of sulphur is a gas while hydride of oxygen is a liquid.

Answer

53. Complete and balance the following reactions:

(1) NaCl + MnO2 + H2SO4 → ___ + ____+____(2) KMnO4 + SO2 + H2O → ____ + ____ + ____

Answer

54. Give balanced equations for the following reactions:

Benzaldehyde reacts with hydrazine.

Answer

55. Give balanced equations for the following reaction:

Acetic acid reacts with phosphorous pentachloride.

Answer

56. Give balanced equations for the following reaction:

Acetone reacts with sodium bisulphite.

Answer

57. Give one chemical test each to distinguish between the following pairs of compounds:

(1) Ethanol and acetic acid

(2) Acetaldehyde and benzaldehyde

Answer

58. Write chemical equations to illustrate the following name reactions:

Clemmensen's reduction

Answer

59. Write chemical equations to illustrate the following name reactions:

Rosenmund's reduction

Answer

60. Write chemical equations to illustrate the following name reactions:

HVZ reaction

Answer

61. Explain why :

Acetaldehyde undergoes aldol condensation, but formaldehyde does not.

Answer

62. Explain why:

Acetic acid is weaker acid as compared to formic acid.

Answer